
गरम करने के लिए तेल
(एल डि ओ) — विशिष्टि
(पहला पुनरीक्षण)

Heating Oil
(L D O) — Specification
(First Revision)

ICS 75.180.20

© BIS 2021



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Petroleum and their Related Products of Synthesis or Biological Origin Sectional Committee was approved by the Petroleum, Coal and Related Products Division Council.

This standard was first published in 2008, when IS 1460 'Automotive diesel fuels — Specification, which covered the requirements and test methods of High Speed Diesel (HSD) and Light Diesel Oil (LDO) meant for automotive and non-automotive application respectively, was revised in 2005. Considering the ever increasing stringency in the requirements of automotive diesel fuel to meet the emerging emission norms, then existed common standard was divided into two separate standards for HSD and LDO. Accordingly a new standard for LDO, meant for non-automotive purposes, IS 15770 : 2008 was brought out. IS 1460 from its fifth revision onwards has been covering only HSD for automotive applications.

In this first revision title of the standard is modified from light diesel oil to heating oil (LDO), aligning the name of the fuel with its usage. As the fuel is identified as LDO in the market, it is retained as part of the main title. Further scope is modified based on its applicability in industrial applications for heating purposes and as a start-up fuel in power plants etc. Requirement of sulphur is modified including a lower limit. The usage of this fuel shall depend on the stipulated requirements of local statutory authorities, as and when required.

The alternate test methods are provided in Annex A for the characteristics stated and in case of dispute the referee method shown in the Table 1 shall be followed. Reference to the overseas standards like ISO, ASTM, etc., have been given as presently there is no Indian Standard available for them. Once the Indian Standards are formulated, the standard will be updated accordingly.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rule for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

HEATING OIL (L D O) — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes requirements and the methods of sampling and tests for heating oil (LDO) for use in industrial applications for heating purposes (boilers, heaters and furnaces) and as a start-up fuel in power plants etc.

This fuel is not meant for internal combustion engines.

WARNING — This draft standard does not purport to address all of the safety problems associated with its use. It is the responsibility of users of this document to take appropriate measures to ensure the safety and health of personnel prior to the application of the standard, and to determine the applicability of regulatory limitations and any other restrictions for this purpose.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and parties to agreements based on the standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
1260 (Part 1) : 1973	Pictorial marking for handling and labeling goods: Part 1 Dangerous goods	(Part 10/ Sec 2) : 2013/ISO 3016 : 1994	Cloud point and pour point, Section 2 Determination of pour point (<i>second revision</i>)
1447 (Part 1) : 2000	Petroleum and its products — Methods of sampling: Part 1 Manual sampling	(Part 12) : 2013/ISO 2049 : 1996	Determination of ASTM colour (<i>second revision</i>)
1448	Methods of test for petroleum and its products:	(Part 15) : 2004/ISO 2160 : 1994	Petroleum products — Corrosiveness to copper — Copper strip test (<i>third revision</i>)
(Part 2) : 2007/ISO 6619 : 1993	Petroleum products and lubricants — Neutralization number-Potentiometric titration method (<i>second revision</i>)	(Part 16) : 2014/ISO 3675 : 1998	Density of crude petroleum and liquid petroleum products by hydrometer method (<i>fourth revision</i>)
(Part 4/Sec 1) : 2008/ISO 6245 : 2001	Petroleum products — Determination of ash (<i>third revision</i>)	(Part 21) : 2019/ISO 2719 : 2002	Determination of flash point — Pensky Martens closed cup method (<i>third revision</i>)
(Part 8) : 2012/ISO 4262 : 1993	Determination of carbon residue — Ramsbottom method (<i>second revision</i>)	(Part 25/Sec 1) : 2018/ISO 3104 : 1994	Determination of kinematic viscosity and calculation of dynamic viscosity (<i>second revision</i>)
		(Part 30) : 2013/ISO 3735 : 1999	Crude petroleum and fuel oils — Determination of sediment — Extraction method (<i>second revision</i>)
		(Part 40) : 2015/ISO 3733 : 1999	Petroleum products and bituminous materials — Determination of water — Distillation method (<i>fourth revision</i>)
		17315 (Part 1) : 2019/ISO 4259-1 : 2017	Petroleum and related products — Precision of measurement Methods and results: Part 1 Determination of precision data in relation to methods of test
		IS 17315 (Part 2) : 2019/ISO 4259-2 : 2017	Petroleum and related products — Precision of measurement methods and results: Part 2 Interpretation and application of precision data in relation to methods of test

3 REQUIREMENTS

3.1 General

The material shall be hydrocarbon oil derived from petroleum. This however, shall not preclude the presence of small amount of additives of hydrocarbon or non-hydrocarbon origin without harmful side effects to improve quality.

3.1.1 The material shall be free from grit, suspended matter, and other visible impurities. It is either a viscous distillate fuel or a blend of distillate fuel and residuum oil.

3.2 The material shall also comply with the requirements prescribed in Table 1, when tested according to the appropriate methods, as given in col 4 of Table 1.

4 SAMPLING

Representative samples of material shall be drawn as prescribed in IS 1447 (Part 1).

5 PACKING AND MARKING

5.1 Packing

5.1.1 The material shall be packed in suitable containers as agreed to between the purchaser and the supplier subject to provision of Red Tariff No.18 Rules and Rates for the conveyance by rail of explosives and other dangerous goods, issued by the Indian Railway Conference Association, with any alternations or additions made thereafter.

5.1.2 Necessary safeguards against the risk arising from the storage and handling of large volumes of flammable liquids shall be provided at all times to prevent accidents by fire or explosion, as required by Petroleum and Explosives Safety Organization (PESO).

5.2 Marking

5.2.1 The material shall be supplied in accordance with the marking and delivery instructions given by the purchaser.

5.2.2 Each container shall be marked with the following information:

- a) Name and grade of the material;
- b) Indication of the source of manufacturer, initials or recognized trade-mark, if any;
- c) Volume of the contents, in litres;
- d) Year and month of manufacturing or packing;
- e) The caution label 'FLAMMABLE' together with the corresponding symbol for labelling Dangerous goods as given in Fig.5 of IS 1260 (Part I); and
- f) Other statutory requirements if any.

5.2.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

Table 1 Requirement for Heating Oil (LDO)

(Clause 3.2)

Sl No.	Characteristics	Requirements	Methods of Test, Part of IS 1448/ASTM D
(1)	(2)	(3)	(4)
i)	Acid number, mg KOH/gm, <i>Max</i>	0.5	Part 2
ii)	Ash, percent by mass, <i>Max</i>	0.02	Part 4/Sec 1
iii)	Carbon residue, on whole samples, percent by mass, <i>Max</i>	1.5	Part 8
iv)	Pour Point, °C, <i>Max</i>		Part 10/Sec 2
	a) Winter [November to February (both months inclusive)],	12	
	b) Summer (rest of the months in a year)	21	
v)	Copper strip corrosion for 3 h at 100 °C	Not worse than No.2	Part 15
vi)	Flash point, Pensky Martens, °C, <i>Min</i>	66.0	Part 21
vii)	Kinematic viscosity at 40 °C, mm ² /sec	2.5-15.0	Part 25/Sec 1
viii)	Sediment, percent by mass, <i>Max</i>	0.10	Part 30
ix)	Density at 15 °C, Kg/m ³	To Report	Part 16
x)	Water content, percent by volume, <i>Max</i>	0.25	Part 40
xi)	Total sulphur, percent by mass	0.005 - 1.50 ³⁾	ASTM D 4294

NOTES

1 All test methods referred to in this standard include a precision statement. The interpretation of results based on test method/precision shall be used whenever applicable. In case of dispute the procedure described in IS 17315-1/ ISO 4259 -1 and IS 17315-2/ISO 4259-2 shall be used.

2 The purchaser/user shall ensure to comply with the relevant statutory requirements.

ANNEX A

(Foreword)

ALTERNATE TEST METHODS

The following alternate test methods exists for the characteristics stated in Table 1.

<i>Characteristic</i>	<i>Alternate Method of Test</i>	<i>Characteristic</i>	<i>Alternate Method of Test</i>
		Density at 15°C	ASTM D1298, ASTM D4052, ISO 3675, IP 160
Ash content	ASTM D482, ISO 6245,	Sediment	ASTM D473
Acidity, (strong acid number)	ISO 6619 , D 664, D 974	Kinematic viscosity	ASTM D7042, ASTM D445, ISO 3104
Flash point	ASTM D93 , ISO 2719	Carbon residue	ASTM D4530, IP13, IP 398, ASTM D 524, ISO 10370
Pour point	ASTM D97, IP 15, ASTM D5950, ASTM D7346, ASTM D5949	Water content	ASTM D95 , IP 471
Total sulphur	ASTM D2622, IP336	Copper corrosion	ISO 2160, ASTM D 130

ANNEX B*(Foreword)***COMMITTEE COMPOSITION**

Petroleum and Their Related Products of Synthesis or Biological Origin Sectional Committee, PCD 3

<i>Organization</i>	<i>Representative(s)</i>
Indian Institute of Technology, Delhi	PROF L. M. DAS (Chairman)
Afton Chemicals, Mumbai	SHRI ANAND KUMAR
Ashok Leyland Ltd, Chennai	SHRI MAHESH P. SHRI BALAKRISHNAN D. (<i>Alternate</i>)
Association of State Road Transport Undertaking (ASRTU), Pune	RESPRENTATIVE
The Automotive Research Association of India (ARAI), Pune	SHRI M. A. BAWASE DR S. S. THIPSE (<i>Alternate</i>)
Bajaj Auto Ltd, Pune	SHRI YOGESH R. MAHAJAN
Bharat Oman Refineries Lid, Sagar, MP	SHRI ANAND PRATAP RAGHAV, SHRI B. SRIDHAR (<i>Alternate</i>)
Bharat Petroleum Corporation Ltd, Mumbai	SHRI R. SUBRAMANIAN SHRI C. SHANMUGANATHAN (<i>Alternate</i>)
Biodiesel Association of India, Mumbai	SHRI SANDEEP CHATURVEDI
Biogas Forum, New Delhi	DR A. R. SHUKLA
Bosch Ltd, Bengaluru	SHRI A. FREDRICK SHRI D. RAMARAJU (<i>Alternate</i>)
Central Pollution Control Board, (Ministry of Environment & Forests), New Delhi	SHRI DINABANDHU GOUDA
Centre for High Technology, New Delhi	SHRI K. K. JAIN SHRI P. RAMAN (<i>Alternate I</i>) SHRI SHEKAR KULKARNI (<i>Alternate II</i>)
Centre for Science and Environment (CSE), New Delhi	MS ANUMITA ROYCHOWDHURY SHRI VIVEK CHATTOPADHYA (<i>Alternate</i>)
Chennai Petroleum Corporation Ltd (CPCL), Chennai	DR V. SELVAVATHI SHRI H .RAMAKRISHNAN (<i>Alternate</i>)
Concert Trust, Consumers Association of India, Chennai	SHRI K. KRISHNAKUMAR SHRI M. SOMASUNDARAM(<i>Alternate</i>)
Consumer Guidance Society of India, Mumbai	DR SITARAM DIXIT DR M. S. KAMATH (<i>Alternate</i>)
DRDO-Centre for Military Airworthiness and Certification, Bengaluru	DR SHIRISH S. KALE SHRI R. SHANMUGAVEL(<i>Alternate</i>)
Ministry of Defence (DRDO), Ahmednagar	SHRI K. MATHIVANAN
Directorate General of Aeronautical Quality Assurance, New Delhi	SHRI SANTOSH NAMDEO SHRI SANTOSH ANMDEO INGOLE (<i>Young Professional</i>)
Directorate General of Civil Aviation, New Delhi	SHRI AMIT GUPTA SHRI RAKESH KUMAR (<i>Alternate I</i>) SHRI DHARMENDRA SINGH YADAV (<i>Alternate II</i>)
Federation of Indian Petroleum Industry, New Delhi	SHRI D. L. N. SASTRI

<i>Organization</i>	<i>Representative(s)</i>
General Motors India Private Limited, Halol	SHRI SUNIL P. S. SHRI RAJENDRA KHILE (<i>Alternate</i>)
Gulf Oil Lubricants India Ltd, Mumbai	DR Y. P. RAO
Hero Motocorp Ltd, New Delhi	SHRI FEROZ ALI KHAN SHRI ABHAY KUMAR (<i>Alternate</i>)
Hindustan Petroleum Corporation Ltd, Mumbai	SHRI ELECHERAN KUMAR SHRI SANTOSH DHAKU BHOGALE (<i>Alternate I</i>) SHRI SHITANSHU PATI TRIPATHI (<i>Alternate II</i>) SHRI ROHIT KUMAR GUPTA (<i>Young Professional</i>)
Honda Cars, Noida, UP	SHRI TARUN BHAT SHRI N. S. TALIB (<i>Alternate</i>)
Indian Institute of Petroleum, Dehradun	DR ANJAN RAY DR T. BHASKAR (<i>Alternate</i>) DR SRINIVAS PADALA (<i>Young Professional</i>)
Indian Oil Corporation Ltd, (R & D Centre), Faridabad	SHRI V. KAGDIYAL
Indian Oil Corporation Ltd, (Refineries), New Delhi	SHRI R. K. KAUSHIK SINGHA DR Y. S. JHALA (<i>Alternate</i>)
Lubrizol India Ltd, Mumbai	SHRI ANAND REDKAR
Mahindra & Mahindra Ltd, Chennai	SHRI R. RAMAPRABHU
Mangalore Refinery & Petro-Chemical Ltd,	SHRI V. NANDA KUMAR SHRI M. SALINA KUMAR (<i>Alternate I</i>) SHRI SUDESH KAMATH P. (<i>Alternate II</i>)
Maruti Udyog Ltd, Gurugram	SHRI SHAILENDER SHARMA SHRI VIKRAM KHANNA (<i>Alternate</i>)
MNRE, Delhi	SHRI S. K. JAGWANI DR VASANTHA THAKUR (<i>Alternate</i>)
Ministry of Railways (RDSO), Lucknow	SHRI RAJESH SRIVASTAVA SHRI SONAM GUPTA (<i>Alternate</i>)
Ministry of New and Renewable Energy, New Delhi	SHRI S. K. JAGWANI DR VASANTHA THAKUR (<i>Alternate</i>)
Ministry of Road Transport & Highways, New Delhi	REPRESENTATIVE
Nayara Energy Limited, Mumbai	SHRI MRIGANKA TARAFDAR SHRI DHAVAL DOSHI (<i>Alternate I</i>) SHRI SABYASACHI KUMAR (<i>Alternate II</i>) SHRI MILAN VASOYA (<i>Young Professional</i>)
Ministry of Petroleum and Natural Gas, New Delhi	SHRI MANISH SARDA SHRI RAJESH MANOCHA (<i>Alternate</i>)
Oil and Natural Gas Corporation Limited, New Delhi	SHRI AJAY KUMAR JAIN SHRIMATI LEENA JOHN (<i>Alternate I</i>) SHRI DINESH S. R. REDDY KAKUTURI (<i>Alternate II</i>)
Petroleum Conservation Research Association, New Delhi	SHRI M. P. BANGWAL
Petroleum and Explosives Safety Organization, Nagpur	DR S. K. DIXIT SHRI NINAD GAWADE (<i>Alternate</i>)
Reliance Petroleum Limited, Mumbai	SHRI SUBIR K. CHATTOPADHYAY SHRI RAVISHANKAR V. DESAI (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
Society of Indian Automobile Manufacturers, New Delhi	SHRI PRASHANT KUMAR BANERJEE DR SANDEEP GARG (<i>Alternate I</i>) SHRI DIWIT PRAJAPATI (<i>Alternate II</i>)
TVS Motor Company Ltd, Hosur, Tamil Nadu	SHRI S. AJITH KUMAR SHRI K. K. GANDHI (<i>Alternate</i>)
Tata Motors Ltd, Pune	SHRI T. SETHURAMALINGAM SHRI PALLIPALAYAM GOWRISHANKAR (<i>Alternate</i>)
BIS Director General	SHRIMATI NAGAMANI T., SCIENTIST 'E' AND HEAD (PCD) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary

SHRIMATI NAGAMANI T.
SCIENTIST 'E' (PCD), BIS

Automotive, Aviation And Industrial Fuels Subcommittee, PCD 3 : 1

<i>Organization</i>	<i>Representative(s)</i>
Gulf Oil Lubricants India Ltd, Mumbai	DR Y. P. RAO (<i>Convener</i>)
Ashok Leyland Ltd, Chennai	SHRI MAHESH P. SHRI D. BALAKRISHNAN (<i>Alternate</i>)
Bajaj Auto Ltd, Pune	SHRI K. RAJAN SHRI R. RAMAKRISHNA (<i>Alternate</i>)
Bharat Petroleum Corporation Ltd, Mumbai	SHRI C. SANMUGANATHAN SHRI V. RAJESH (<i>Alternate</i>) SHRI MELLA LOKESH KUMAR (<i>Young Professional</i>)
Central Revenue Control Laboratory, New Delhi BORL, Bina	DR Y. K. S. RATHORE SHRI B. SRIDHAR SHRI BHARAT KUMAR SHARMA (<i>Alternate</i>)
Centre For High Technology, New Delhi	SHRI K. K. JAIN SHRI P. RAMAN (<i>Alternate</i>) SHRI SHEKAR KULKARNI (<i>Young Professional</i>)
Centre for Science and Environment (CSE), New Delhi	Ms ANUMITA ROYCHOWDHURY SHRI VIVEK CHATTOPADHYA (<i>Alternate</i>)
Chennai Petroleum Corporation Ltd, Chennai	DR V. SELVAVATHI SHRI H. RAMAKRISHNAN (<i>Alternate</i>)
CIMAC India, Faridabad	SHRI N. K. BANSAL
CONCERT, Chennai	SHRI K. KRISHNA KUMAR SHRI M. SOMASUNDARAM (<i>Alternate</i>)
DRDO - Centre for Military Airworthiness and Certification, Bengaluru	DR R. KAMALA KANNAN SHRI R. SHANMUGAVEL (<i>Alternate</i>)
Federation of Indian Petroleum Industry, New Delhi	SHRI D. L. N. SASTRI
Directorate General of Civil Aviation, New Delhi	SHRI AMIT GUPTA SHRI DHARMENDRA SINGH YADAV (<i>Alternate I</i>) SHRI RAKESH KUMAR (<i>Alternate II</i>)

<i>Organization</i>	<i>Representative(s)</i>
Directorate of Indigenisation, New Delhi	GP CAPT ASHEESH SHRIVASTAVA
Directorate General of Quality Assurance, Ministry of Defence, New Delhi	SHRI S. K. PANDEY SHRI A. K. KANAUIA (<i>Alternate</i>)
HP Green Research and Development Centre, Bengaluru	SHRI B. RAVI SHRI K. RAGHAVA KRISHNA (<i>Alternate</i>)
Nayara Energy Limited	SHRI MRIGANKA TARAFDAR SHRI DHAVAL DOSHI (<i>Alternate I</i>) SHRI SABYASACHI KUMAR (<i>Alternate II</i>) SHRI MILAN VASOYA (<i>Young Professional</i>)
Hindustan Petroleum Corpn. Ltd, Mumbai	SHRI ELECHERAN KUMAR SHRI SHITANSHU PATI TRIPATHI (<i>Alternate I</i>) SHRI SANTOSH DHAKU BHOGALE (<i>Alternate II</i>) SHRI ROHIT KUMAR GUPTA (<i>Young Professional</i>)
Indian Institute of Technology, (CES), Delhi	PROF V. K. VIJAY
Indian Oil Corporation Ltd. (Marketing Division), Mumbai	SHRI P. D. DUSANE
Indian Oil Corporation Ltd (R & D Centre), Faridabad	DR A. K. ARORA DR A. P. SINGH (<i>Alternate</i>)
Indian Oil Corporation Ltd (R&P Division), New Delhi	MS SOMA CHATTOPADHAYA DR Y. S. JHALA (<i>Alternate</i>)
Kochi-BPCL Refineries Ltd, Kochi	SHRI ADALAZHAGAN K. SHRI R. RAJU (<i>Alternate</i>)
Lubrizol India Ltd, Mumbai	SHRI ANAND REDKAR
Mahindra & Mahindra Ltd, Nasik	SHRI R. RAMAPRABHU
Mangalore Refinery & Petro-chemical Ltd, Mangalore	SHRI V. NANDA KUMAR SHRI SALINA KUMAR (<i>Alternate I</i>) SHRI HARADI ANAND ASHOK (<i>Alternate II</i>)
Maruti Udyog Ltd, Gurugram	SHRI SHAILENDER SHARMA SHRI VIKRAM KHANNA (<i>Alternate</i>)
Ministry of Petroleum and Natural Gas, New Delhi	SHRI MANISH SARDA SHRI RAJESH MANOCHA KHANNA (<i>Alternate</i>)
Ministry of Railways (RDSO), Lucknow	SHRI RAJESH SRIVASTAVA SHRI SONAM GUPTA (<i>Alternate</i>)
Bosch Ltd, Bengaluru	SHRI A. FREDRICK SHRI D. RAMARAJU (<i>Alternate</i>)
Numaligarh Refinery Ltd, Assam	SHRI BIMLESH GUPTA SHRI PALLAB DAS (<i>Alternate</i>)
ONGC, New Delhi	SHRI AJAY KUMAR JAIN SHRIMATI LEENA JOHN (<i>Alternate I</i>) SHRI DINESH S. R. REDDY KAKUTURI (<i>Alternate II</i>)
Indian Institute of Petroleum, Dehra Dun	DR ANIL KUMAR SINHA SHRI SUNIL KUMAR PATHAK (<i>Alternate</i>) SHRI SALEEM A. FAROOQUI (<i>Young Professional</i>)
Honda Cars, Noida	SHRI TARUN BHAT SHRI N. S. TALIB (<i>Alternate</i>)
Reliance Industries Ltd, Mumbai	SHRI SUBIR K. CHATTOPADHYAY SHRI RAVISHANKAR V. DESAI (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
Society for Petroleum Laboratory (SFPL)/Fuel Testing Laboratory(FTL), Noida	DR A. K. GUPTA
Society of Indian Automobile Manufacturers, New Delhi	SHRI P. K. BANERJEE DR SANDEEP GARG (<i>Alternate</i>)
Tata Motors Ltd, Pune	SHRI T. SETHURAMALINGAM SHRI PALLIPALAYAM GOWRISHANKAR (<i>Alternate</i>)
The Automotive Research Association of India, Pune	SHRI M. A. BAWASE DR S. S. THIPSE (<i>Alternate</i>)
Hero Moto Corp, New Delhi	SHRI FERAZ ALI KHAN SHRI ABHAY KUMAR (<i>Alternate</i>)
Afton Chemicals, Mumbai	SHRI HARSHAD JAMBAULIKAR SHRI JEENAL PATEL (<i>Alternate</i>)
ISMA, Delhi	SHRI G. K. THAKUR
Kaleesuwari Refinery and Industry Pvt Ltd (KRIPL) MNRE, Delhi	SHRI SHYAM SUNDAR SAI NUDURUPATI SHRI S. K. JAGWANI DR VASANTHA THAKUR (<i>Alternate</i>)
Ultra Plus Lubes Pvt, Ltd	SHRI SIDDESH N. SAVANT SHRI N. C. SEKCHARAN (<i>Alternate</i>) SHRIMATI ROHINI NIKAM (<i>Young Professional</i>)
Universal Biofuels Private Limited, Hyderabad	SHRI SANJEEV GUPTA

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc No.: PCD 03 (16766).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

Telephones

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg CHANDIGARH 160019	{ 265 0206 265 0290
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	{ 2254 1216, 2254 1442 2254 2519, 2254 2315
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	{ 2832 9295, 2832 7858 2832 7891, 2832 7892

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. COIMBATORE.
DEHRADUN. DURGAPUR. FARIDABAD. GHAZIABAD. GUWAHATI.
HYDERABAD. JAIPUR. JAMMU. JAMSHEDPUR. KOCHI. LUCKNOW.
NAGPUR. PARWANOO. PATNA. PUNE. RAIPUR. RAJKOT. VISAKHAPATNAM.

Published by BIS, New Delhi